

Application No. 10/693,349
Response dated May 11, 2005
Reply to Office Action of February 24, 2005

REMARKS

Claims 1-12 are pending in the above-referenced application.

In the Office Action, the Examiner:

suggested that claims 1 and 7 be amended to correct error of language, punctuation, and antecedent bases;

rejected claims 1-5 and 7-14 under 35 U.S.C. § 102(b) as being anticipated by Hickerson (U.S. Patent No. 2,799,466); and

rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Hickerson in view of Nishimi et al. (U.S. Patent No. 4,201,362).

Applicants have amended claims 1 and 7 to particularly point out and distinctly claim the subject matter that Applicants regard as the invention and to respond to the Examiner's concerns.

Section 102 Rejection:

In the Office Action, the Examiner rejected claims 1-5 and 7-14 as being anticipated by Hickerson. Amended claim 1, which is directed to an axial valve, recites, among other things, a housing, a valve element controlled by a pilot valve and guided by an interior surface of the housing, and a guide arranged in the housing between the inlet and outlet, wherein the valve element is guided by an exterior surface of the guide. Claims 2-5 and 7-14 depend directly or indirectly from claim 1.

Hickerson fails to disclose a guide arranged in the housing between the inlet and outlet wherein the valve element is guided by an exterior surface of the guide. Hickerson discloses a valve having a valve body 10, a valve seat 21, a piston 13 controlled by an electric shut-off valve 31 and an annular chamber 28 arranged between the valve body and the piston. When valve 31 is closed, a pressure builds in annular chamber 28, causing piston 13 to be pressed against seat 21. Hickerson discloses that piston 13 is guided by interior bore surfaces 11, 12 of valve body 10.

In contrast, amended claim 1 recites that the valve element is guided by an exterior surface of a guide that is arranged in the housing. Thus, the valve element is guided both by an interior surface of the housing and by the exterior surface of the guide. This provides an increased stability for the guiding of the valve element.

Hickerson fails to disclose that the valve element is guided by an interior surface of the housing and by an exterior surface of a guide element. Thus, Hickerson fails to disclose each and every element of claim 1 and fails to anticipate claim 1. Claims 2-5 and 7-14 depend directly or indirectly from claim 1 and contain additional recitations thereto. For at least the reasons discussed above, Hickerson also fails to anticipate these claims.

Section 103 rejection:

In the Office Action, the Examiner rejected claim 6 as being anticipated by Hickerson in view of Nishimi. Claim 6, which depends from claim 1, additionally recites that the valve element is guided without seals in a housing bore. The Examiner acknowledges that Hickerson lacks a valve element guided without seals. However, the Examiner notes that Nishimi discloses a valve element 11 guided without seals and asserts that it would have been obvious to make the valve element of Hickerson with seals as disclosed by Nishimi. Applicants respectfully disagree.

Applicants submit that the Examiner has failed to establish a *prima facie* case for combining Nishimi with Hickerson. For a section 103 rejection to be valid, a suggestion or motivation to combine the references must be found in one of the references. In this instance, the teachings of Hickerson are incompatible with the teachings of Nishimi, because eliminating the seals of Hickerson as taught by Nishimi would result in an inoperative device or an undesirably more complex and costly device.

Hickerson specifically teaches the necessity of seals 14, 17 and would be inoperable without these seals. Hickerson teaches that the pressure of annular chamber 28 must drop in order for piston 13 to move to the left and open the valve.

When valve 31 is opened, the pressure within annular chamber 28 drops because, as Hickerson explicitly teaches, orifice 27 is sized to have a higher pressure drop than the flow system of valve 31 (col. 3, lines 13-18). Hickerson also teaches that seal 14 prevents leakage between piston 13 and bore 12 (col. 2, lines 62-63) and that seal 17 prevents leakage between flow chamber 26 and annular chamber 28 (col. 2, lines 19-23). Thus, seals 14, 17 prevent flow, other than through orifice 27, into chamber 28. Creating other passages for fluid flow into annular chamber 28 by eliminating seals 14, 17 would prevent or inhibit the pressure within annular chamber 28 from dropping when valve 31 is opened. Therefore, eliminating seals 14, 17 renders the invention of Hickerson inoperative or requires further undesirable modifications, as discussed below.

Nishimi teaches flow through gap CA and through pressure equalizing port EA into volume V1. Importantly, Nishimi teaches that to overcome the volume of flow into V1 from gap CA and port EA, auxiliary pilot valves become necessary as the valve piston 11 becomes larger. Thus, even with a single source of leakage, gap CA, Nishimi teaches using auxiliary pilot valves to accommodate the large flows necessary to reduce the pressure in volume V1. Adding auxiliary pilot valves adds complexity and cost and is not desirable. Moreover, eliminating seals 14, 17 from Hickerson would result in two sources of leakage into annular chamber 28, not just one as taught by Nishimi. Thus, the problem solved by Nishimi for a single source of leakage by the additional use of auxiliary pilot valves would be even more exacerbated in Hickerson if seals 14, 17 were eliminated. Thus, a person of ordinary skill in the art would not be motivated to eliminate seals 14, 17, because, as taught by Nishimi the additional, undesirable complexity of auxiliary pilot valves becomes a necessity.

Further, the Examiner's reasoning for making the valve of Hickerson without seals as disclosed by Nishimi, i.e. to reduce production time of making the device as seals would be eliminated as well as cost savings, is obviated in view of the additional complexity taught by Nishimi in the absence of seals.

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The Examiner has failed to establish a prima facie case that a person of ordinary skill in the art would be motivated to eliminate the seals of Hickerson based on the teachings of Nishimi. Thus, Applicants submit that the section 103 rejection of claim 6 is improper and should be withdrawn.

Applicants believe that they have addressed every objection and rejection raised by the Examiner in the Office Action and that claims 1-14 and the present application are in condition for allowance.

Should the Examiner have any questions regarding the present application, Applicants respectfully request that the Examiner contact Applicants' representative at the phone number listed below.

While Applicants believe no fees are due with the filing of this response, please charge any deficiencies in fees associated with this filing to our Deposit Account No. 13-0235.

Respectfully submitted,

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